

# Dialysis Treatment Use and Costs Reported in VA Administrative Databases

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## Executive Summary

Kidney dialysis is performed roughly 300,000 times per year at VA facilities nationwide. Dialysis is provided by VA staff and by contractors in a series of arrangements that varies by location and year. If it were used consistently across sites, the Decision Support System (DSS) would yield reliable estimates of the frequency, type, and cost of dialysis procedures. In practice, however, there is considerable variation in how sites have tracked and assigned costs to dialysis. As a result, relatively little is known about the cost of providing dialysis to VA patients.

There are several reasons to assess and validate the cost of dialysis. First, managers must understand operational unit costs in order to make decisions about whether to provide dialysis care directly or through contractors. Both arrangements are used in all VISNs and at many if not all VA acute-care hospitals. Increasing or decreasing reliance on contractors may be important policy options for senior managers. Second, VA researchers need to know the cost of dialysis in order to properly determine the cost of inpatient stays and outpatient encounters, such as those occurring within Cooperative Studies Program trials. Third, charting the availability of VA data on dialysis will facilitate comparisons across VA facilities in the use and cost of dialysis treatments.

In this report we review current VA data on dialysis procedures. We describe several DSS extracts that record dialysis care and explain step by step how to access them. An appendix lists the procedure codes and other variables used to locate dialysis care in DSS utilization records. We show the frequency of dialysis procedures recorded in DSS and the implied average cost per hour or per encounter. We also report figures from alternative utilization and cost data sources, the National Patient Care Database (NPCD) and the HERC Average Cost datasets. The report ends with recommendations for researchers and policymakers.

We located four sources of data on dialysis provided by VA. All can be accessed through the VA intranet, and three can be accessed through a time-share account at the Austin Automation Center. They provide utilization and cost data at differing levels of aggregation: individual outpatient procedures, represented by CPT codes; hours of care within particular DSS production units; clinic codes, also called stop codes or clinic stops; and a Monthly Program Cost Report (MPCR) account. Some provide additional detail, such as separate values for direct and indirect costs. The four sources feature data at the VISN and national level, and some allow the user to drill down to individual VA health care systems within a VISN, and even to particular divisions within a system. One source allows users to determine the mix of staff types (e.g., RN, MD) used at each facility.

The average cost of dialysis varied considerably by source and treatment mode. Estimates from DSS production unit analyses were lowest, averaging \$354 per episode for hemodialysis and \$223 for peritoneal dialysis in clinic. Estimates based on data from MPCR accounts and clinic codes (stop codes) ranged from \$406-\$721 for hemodialysis and \$521-\$809 for peritoneal dialysis in clinic. Estimates from NPCD and HERC data ranged from \$374-\$814 per episode of hemodialysis and \$250-\$538 for peritoneal dialysis.

## I. Introduction

Kidney dialysis is a blanket term for procedures that remove toxins from the blood. It is prescribed when a person shows evidence of severe or complete kidney failure. Dialysis is used most commonly to treat the chronic condition known as end-stage renal disease (ESRD). It is also prescribed for acute renal failure (ARF) and for chronic renal insufficiency that does not meet the definition of ESRD.

Dialysis is frequently performed in the VA health care system. In FY2004 there were over 300,000 encounters recorded in clinic code 602 (Chronic Assisted Hemodialysis) in the Decision Support System (DSS), and more than 3,000 encounters for peritoneal dialysis. Intermittent methods such as hemodialysis and peritoneal dialysis may be performed on both inpatients and outpatients. Inpatients with severe blood pressure instability receive slower forms of hemodialysis or hemofiltration.<sup>1</sup> Loss and recovery of renal function can occur slowly or quickly, and thus the number of dialysis treatments received can range from one to many hundreds over a patient's lifetime.

As detailed in the following sections, the several methods of estimating dialysis workload in VA datasets produce somewhat different counts of total encounters and average cost. Reliable information on cost and utilization would be useful for facility and staff planning, for operational management, contract negotiation with dialysis vendors, and for health services and health economics research on patients undergoing dialysis.

This report has three goals:

1. To describe how dialysis is coded and costed in VA utilization databases
2. To estimate the cost of dialysis in the VA system and the cost of VA-funded dialysis outside the VA system
3. To present recommendations on how to locate and assign a cost to dialysis

The report presents descriptive statistics on the frequency and types of dialysis procedures recorded in major VA utilization databases. It also presents descriptive statistics on the costs of each type of dialysis, both for the system as a whole and for the individual sites participating in a major VA clinical trial. Information gleaned from these data and from conversations with VA experts support the recommendations found in the last section.

We gathered information for the report from several sources. We interviewed a DSS expert, Jim Jackson, BSN, RN, BBA, the Decision Support Manager and Clinical Facilitator of the Portland VA Medical Center. We extracted utilization and cost data through two web-based systems. One was KLFMenu, the website of the VISN Support Services Center. The second was the Financial and Clinical Data Mart (FCDM), accessible directly and through KLFMenu. Additional cost and utilization data were downloaded from the VA Austin Automation Center.

The report proceeds as follows. Section II summarizes the methods for locating dialysis within utilization data. Section III briefly describes the DSS data sources and presents tables of outpatient utilization and cost data from each. Similar information appears in Section IV for data from the Outpatient Care file (OPC) and the HERC Average Cost data. Section V discusses the

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<sup>1</sup> Throughout this report, the term 'hemodialysis' will include hemofiltration.

varying cost estimates implied by the data sources and provides tentative explanations for the differences observed. Section VI describes obstacles to locating inpatient dialysis data. Section VII presents data on VA-paid dialysis at non-VA facilities. Section VIII concludes the report with recommendations for researchers and policymakers. Two appendices contain a number of tables and instructions for accessing the web-based data sources.

## II. Identifying Dialysis

There are several ways to identify dialysis treatment. These include procedure codes on inpatient and outpatient records; procedure codes in outpatient Fee Basis records; and records in the national VA prosthetics database for tubing and other dialysis-related materials. Beyond these, inpatient and outpatient diagnosis codes may be used to confirm an indication for dialysis. Each of these sources will be described in turn. The VIREC web site ([www.virec.research.med.va.gov](http://www.virec.research.med.va.gov)) provides details on file structures and access methods for each dataset.

### OUTPATIENT PROCEDURE CODES

The VISTA system records outpatient visits by a stop code. The associated encounter record contains ICD-9-CM diagnostic codes and procedures using Current Procedural Terminology (CPT) codes. It also accepts HCPCS codes, an expanded set of CPT codes that include codes starting with alphabetic characters rather than numbers.<sup>2</sup> Stop codes and procedure codes are passed to the National Patient Care Database (NPCD). NPCD is the source of the OPC outpatient utilization files, also called the Medical SAS Outpatient files. This same data passes to the DSS databases when facilities do their monthly processing. These processed DSS data are pulled quarterly through the outpatient National Data Extracts (NDEs) and then become available to users on the KLFMenu DSS and the Financial and Clinical Data Mart (FCDM).

Several dozen CPT and HCPCS codes pertain to dialysis; see Table A1 of Appendix 1 for a listing. Not all of these will appear in VA records. Four of the codes apply solely to children and thus should never apply to VA patients. Codes may also become obsolete or may pertain to services not provided by VA.

### INPATIENT PROCEDURE CODES

VISTA records inpatient procedures with ICD-9-CM procedure codes.<sup>3</sup> In 2004, dialysis was represented by three codes: one for hemodialysis (39.95), one for peritoneal dialysis (54.98), and one for a related catheterization (54.93; see Table A1).

### PROSTHETICS RECORDS

In VA, the term “prosthetics” refers to artificial limbs and joints, cardiac pacemakers, stents, catheters, external and internal fixation devices, sensory aids (e.g., glasses, hearing aids), wheelchairs, and many other items employed to install, maintain, adjust, or use these devices.

The National Prosthetics Patient Database (NPPD) stores information on prosthetics dispensed by VA providers. The file layout, variable description, and access information for NPPD are detailed in Pape et al. (2001).<sup>4</sup> Through FY2003, NPPD recorded the type of item dispensed through two codes: the five-digit HCPCS CPT code and the five-digit HCPCS-PSAS code.<sup>5</sup> Since FY2004, only the HCPCS-PSAS code has been used.

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<sup>2</sup> HCPCS is the Health Care Financing Administration Common Procedure Coding System.

<sup>3</sup> VA will switch to ICD-10 codes in the near future.

<sup>4</sup> A change in NPPD staff has occurred since the publication of the Pape et al. report. Questions about database construction should be sent to Ms. Liz Kiley of the Hines VA medical center.

<sup>5</sup> PSAS refers to the VA Prosthetic and Sensory Aids Services.

Having separate fields for CPT and PSAS codes enabled VA to bill private insurers even when the proper code was unknown. If the purchasing agent creating the NPPD record knew the proper CPT or HCPCS code, then that value appears in both CPT and PSAS fields. If the purchasing agent did not know the proper CPT code, the PSAS field contained the value “UNKNOWN” and the CPT code was E1399 (DME miscellaneous).

HCPCS codes from a particular year are not exhaustive; additional codes may appear in earlier or later years. For example, certain elements of dialysis machinery that were formerly ordered separately are now integral to the machines. Examples include the heparin infusion pump (code E1520) and the replacement air detector (E1530).

## NON-VA CARE

VA will pay for veterans’ health care at non-VA facilities when VA cannot provide the care or when it is provided more efficiently outside the VA system. VA records of these outside services are spotty and are divided among several files, sometimes with overlap. Non-VA care may be paid through a contract, through a sharing agreement, or on a fee-for-service basis. The payment method will determine which file records the care: Fee Basis, Non-VA Hospitalization, or VISTA. Inpatient care at outside facilities provided under contract to VA should appear in the Non-VA Hospitalization files. When the care is provided on a fee-for-service basis through the Fee Basis program, it should appear in the Fee Basis (or “FEE”) files. Not all hospitalizations paid on a fee basis appear in the Fee Basis files, however.

The Fee Basis files are primarily intended to justify and record payment to non-VA providers. Seven files are created each year to record medical care, pharmacy services, travel costs, and other costs. In practice, dialysis records are likely to be found only in the outpatient services (MED) file. Dialysis records may be located through the CPT or HCPCS procedure code (variables CPT1-CPT15).

The Non-VA Hospitalization files constitute one group of VHA Medical SAS Datasets, all of which share a common file structure. There are four files each year: Main, Bed Section, Procedure, and Surgery. Inpatient dialysis may appear in the Procedure file, if it is recorded at all. It is highly unlikely to appear in the other three files. For details on file structure and variables, consult the VIREC webpage: <http://www.virec.research.med.va.gov/DataSourcesName/Medical-SAS-Datasets/SAS.htm>.

### **III. Workload and Costs in FY2004 DSS Data**

Dialysis workload will appear in the two primary sources of VA utilization data, the traditional OPC (outpatient) and PTF (inpatient) files and the newer DSS National Data Extracts (NDEs). Both draw from the VISTA packages that record inpatient and outpatient procedures, although their coverage of inpatient and outpatient data varies slightly (Yu and Barnett 2003). This section describes data on dialysis available through DSS and through the Monthly Program Cost Report (MPCR), which is based in part on DSS figures. Section IV presents similar data from the OPC matched to costs from the HERC Average Cost dataset.

Although most encounters pertaining to dialysis will be for dialysis itself, there are other reasons why an encounter record may be generated. For example, a patient may discuss the interaction of dialysis with comorbid conditions. Clinic codes and procedure codes in theory enable the researcher to distinguish training from other services. To our knowledge, though, no one has studied whether that coding distinction is made in practice. A similar caveat applies to other tracking methods.

We accessed all DSS and MPCR data through the KLFMenu, the common name for the VA VSSC web site. The KLFMenu features an application that creates summary data reports in real time. Although more detailed DSS data are available in files stored in SAS format the Austin Automation Center (AAC), accessing them requires knowledge of the SAS programming language and an AAC timeshare account. One can also use the KLFMenu to link to the Financial and Clinical Data Mart (FCDM), which also features a report-generating application.

All data reported below are from FY2004. We specified the September files (fiscal period 12) in order to obtain data for the entire fiscal year. Dollar figures have not been adjusted for inflation.

#### **ANALYSIS BY DSS PRODUCTION UNIT CODE**

An intermediate step in the DSS system of data processing is the creation of Account Level Budget Cost Center (ALBCC) reports. Costs from the Financial Management System (FMS) and the VA payroll system (PAID) are attributed to individual ALB cost centers. The costs are then stepped down to patient care departments, also known as production units. (The production units pertaining to dialysis and nephrology are shown in Table 1.) These are direct costs only; indirect costs for teaching, research, and administration are added at a later stage of DSS processing.

We extracted FY2004 ALBCC data from KLFMenu. Its software enables the user to calculate summary data for particular fiscal years and geographic areas. We aggregated total annual hours and direct costs at the national level for each production unit in Table 1. We then calculated descriptive statistics for the implied direct cost per hour within each production unit.

Dialysis is often grouped heuristically by type or location. We therefore classified the production units into related groups and calculated the same statistics for each group. The groups and their corresponding production unit codes were as follows:



**Table 1. DSS Dialysis and Nephrology Production Units, FY2004**

<b>Production Unit Code</b>	<b>Production Unit Name</b>
2E	Home Dialysis Unit
2F	Nephrology
2G	Inpatient Dialysis
2I	Hemodialysis Unit
2J	Peritoneal Dialysis Unit
2K	Dialysis OP
LO	Acute Hemodialysis Treatment Clinic
LP	Dialysis Outpatient CL
LR	Home Dialysis Clinic
LS	Chronic Assisted Peritoneal Dialysis CL
LT	Limited Self Care Peritoneal Dialysis C
LU	Home Peritoneal Dialysis Training CL
MD	Renal/Nephrology Clinic(s)

- Hemodialysis in Clinic (2G, 2I, 2K, LO, LP)
- Peritoneal Dialysis in Clinic (2J, LS, LT)
- Home Dialysis (2E, LR, LU)
- Related Production Units (2F, MD)

All forms of hemodialysis are reported together within the hemodialysis production units. The DSS system does not capture the distinction between modes such as intermittent hemodialysis, hemofiltration, and slow low-efficiency dialysis (SLED), among others.

Utilization and direct cost figures appear in Table 2. We found that three dialysis-related production units were never used in FY2004. As expected, the great majority of spending was for hemodialysis treatments in clinics. These units include outpatient and most inpatient care. Only two sites recorded peritoneal dialysis. Home dialysis was more common but still rare.<sup>6</sup> Of the two related production units, only “Renal/Nephrology Clinic(s)” was used frequently.<sup>7</sup>

Later figures in this report include both direct and indirect costs. The DSS system calculates indirect costs for each direct care particular production unit but does not make them accessible in the NDEs at this time. The DSS indirect allocation has two components, hospital-wide indirect costs and service-specific indirects (e.g., Medicine Service Administration, Research and Education). The split of these two indirect components varies by the research and educational mission of both the facility and the service within a facility. In addition, as the VA’s national cost accounting system, DSS is required to “fully allocate” VHA costs. This means that VA central office costs for staff, national programs, and depreciation are also charged to the facilities

<sup>6</sup> The VA Allocation Resource Center (ARC) produces an annual report listing “self-reported” frequency of home dialysis by facility and fiscal period (month). The report is available on the ARC web site within the VA intranet.

<sup>7</sup> According to best practice, most uses of the Renal/Nephrology Clinic(s) code will not represent dialysis care.

and allocated as indirect overhead. In FY2004, the ratio of total indirect to total direct costs across all production units was 50.93%. Table 2 shows the average direct costs within major code groups, weighted by workload. It also shows the same figures raised by 50.93% to approximate the total cost. The total cost figures are more closely comparable to figures in later tables, which report indirect and direct costs either separately or together.

**Table 2. National Hours and Direct Costs for Dialysis-Related DSS Production Units, FY2004**

<b>Production Unit</b>	<b>Production Unit Name</b>	<b>Total Hours</b>	<b>Total Cost</b>	<b>Average Cost/Hour</b>
<b>Hemodialysis in Clinic</b>				
2G	Inpatient Dialysis	112,063	\$ 4,302,573	\$ 38.39
2I	Hemodialysis Unit	529,459	\$ 29,172,832	\$ 55.10
2K	Dialysis OP	212,702	\$ 9,686,107	\$ 45.54
LP	Dialysis Outpatient CL	940,505	\$ 50,898,803	\$ 54.12
LO	Acute Hemodialysis Treatment Clinic *	--	--	--
Subtotal -	direct cost	1,794,729	\$ 94,060,315	\$ 52.41
Subtotal -	direct cost + 51% indirect cost**	1,794,729	\$ 141,965,233	\$ 79.10
<b>Peritoneal Dialysis in Clinic</b>				
2J	Peritoneal Dialysis Unit *	--	--	--
LS	Chronic Assisted Peritoneal Dialysis CL	2,244	\$ 62,252	\$ 27.74
LT	Limited Self Care Peritoneal Dialysis C *	--	--	--
Subtotal -	direct cost	2,244	\$ 62,252	\$ 27.74
Subtotal -	direct cost + 51% indirect cost**	2,244	\$ 93,957	\$ 41.87
<b>Home Dialysis</b>				
2E	Home Dialysis Unit	6,651	\$ 874,958	\$ 131.55
LR	Home Dialysis Clinic	4,588	\$ 427,064	\$ 93.08
LU	Home Peritoneal Dialysis Training CL	1,982	\$ 75,452	\$ 38.07
Subtotal -	direct cost	13,221	\$ 1,377,473	\$ 104.19
Subtotal -	direct cost + 51% indirect cost**	13,221	\$ 2,079,020	\$ 157.25
<b>Related Production Units</b>				
2F	Nephrology	1,586	\$ 54,481	\$ 34.35
MD	Renal/Nephrology Clinic(s)	582,955	\$ 29,664,503	\$ 50.89
Subtotal -	direct cost	584,541	\$ 29,718,984	\$ 50.84
Subtotal -	direct cost + 51% indirect cost**	584,541	\$ 44,854,863	\$ 76.73

\* This production unit was not used in FY2004.

\*\* The average indirect rate for all production units, 50.93%, was added to provide an approximate total cost.

### CSP #530 Sites

Eighteen VA stations served as study sites in the Acute Renal Failure Trial Network (ATN) trial (CSP #530) in FY2004. See Table A2 of Appendix 1 for a list of these stations. We derived separate figures for individual sites in order to show the variation in workload, costs, and production units that occurs across sites, information not apparent from national totals. CSP #530 was chosen because it is a study of kidney dialysis treatment.

Across the 18 stations, we determined how many hours were reported in each production unit listed in Table 1. We also determined the total associated cost, weighting each station by the number of hours it used the production unit. Because the formulas imbedded in DSS vary by VA station, the estimated cost per hour will vary by station.

Results appear in Tables A3 and A4 of Appendix 1. There was considerable variation in the range of production units used in the local DSS systems of the study sites. Seven production units were used in total, but 11 of the 18 sites used only one for all dialysis care, either LP (Dialysis Outpatient CL) or 2I (Hemodialysis Unit).<sup>8</sup> Five sites used two production units, and two used four production units. Only two sites in CSP #530 used any production units for peritoneal dialysis, and only three used any for home dialysis. None used the Nephrology (2F) code, but all used the Renal/Nephrology Clinic(s) code.

### ANALYSIS BY CLINIC CODE

Clinic codes, also called stop codes or clinic stops, represent another system for aggregating VA workload. All dialysis procedures are represented by stop codes 601-611. As noted in Table 3, only seven were used at any VA site in FY2004: 602-604, 606-608, and 611.

**Table 3. DSS Dialysis Clinic Codes, FY2004**

<b>Clinic Code</b>	<b>Name</b>	<b>Proportion of All FY2004 Dialysis Encounters*</b>
601	Acute Hemodialysis Treatment	—
602	Chronic Assisted Hemodialysis	98.1 %
603	Limited Self Hemodialysis	0.1 %
604	Home Hemodialysis Training	0.4 %
605	Acute Peritoneal Dialysis Treatment	—
606	Chronic Assisted Peritoneal Dialysis	0.7 %
607	Limited Assisted Peritoneal Dialysis	0.2 %
608	Home Peritoneal Dialysis Training	0.2 %
609	Home Hemodialysis Treatment	—
610	Contract Hemodialysis	—
611	Telephone Dialysis	0.4 %

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<sup>8</sup> The frequent use of LP (Dialysis Outpatient CL) was not surprising: it is associated with workload from clinic code 602, which captures most dialysis care.

\* Source: DSS National Data Extract, Outpatient Analysis & Cost Reports.

More than 98% of all recorded dialysis procedures in FY2004 were assigned to clinic 602 (Chronic Assisted Hemodialysis). Clinic 602 includes nearly all outpatients receiving hemodialysis at a VA facility as well as inpatients who visit the hospital dialysis clinic. Reporting may not be consistent across inpatient bedsections, however, or across facilities. Dialysis for ICU patients is not counted under clinic 602 in all cases. Because dialysis machinery is taken to the ICU, dialysis costs may be subsumed under department overhead at some sites. Nephrologist visits are coded under clinic 602 at some facilities, while at others they are reported under a separate nephrology clinic, such as 313 (renal/nephrology except dialysis).

Table 4 presents workload and cost data by clinic code for those codes having nonzero workload in FY2004. Both direct and indirect costs are included. As expected, nearly all visits and dollars were attributed to clinic code 602. Weighting the codes by the number of visits, the average cost was \$469.01. Telephone dialysis was excluded in order to increase comparability with data at the MPCR Account level, below.

**Table 4. Total Visits and Costs for Dialysis-Related Clinic Codes, FY2004 DSS NDE**

<b>Clinic Code</b>	<b>Clinic Code Name</b>	<b>Total Visits</b>	<b>Total Cost</b>	<b>Average Cost / Visit</b>
602	Chronic Assisted Hemodialysis	300,139	\$139,601,391	\$ 465.12
603	Limited Self Hemodialysis	190	\$ 48,912	\$ 257.43
604	Home Hemodialysis Training	1,302	\$ 1,776,190	\$ 1,364.20
606	Chronic Assisted Peritoneal Hemo.	2,353	\$ 1,225,901	\$ 520.99
607	Limited Self Peritoneal Dialysis	641	\$ 252,202	\$ 393.45
608	Home Peritoneal Dialysis Training	542	\$ 221,269	\$ 408.25
Weighted average across codes 602-608:				\$ 469.01
611	Telephone Dialysis	1,024	\$ 49,029	\$ 47.88

#### ANALYSIS BY MPCR ACCOUNT

A third source of dialysis cost and workload data is the Monthly Program Cost Report (MPCR), a detailed report based on DSS data. MPCR replaces the former Cost Distribution Report (CDR). Workload and costs are sorted into four-digit accounts with two-digit suffixes. The two pertaining exclusively to dialysis are 2410.00 (Dialysis) and 2410.30 (Dialysis -- Indirect).

MPCR accounts aggregate data from particular clinic codes. As shown in Table 5, the dialysis accounts include data from codes 602-604 and 606-608. Clinic code 611 (Telephone Dialysis) appears under MPCR account 2780 with all other telephone-based care.

**Table 5. MPCR Accounts Pertaining Exclusively to Dialysis**

<b>MPCR Account</b>	<b>Name</b>	<b>Corresponding Clinic Codes</b>
2410.00	Dialysis	602-604, 606-608
2410.30	Dialysis – Indirect	602-604, 606-608

MPCR dialysis workload and costs for dialysis appear in Table 6. Note that the unit of workload here is the visit rather than the hour. MPCR does not assign visits to indirect cost accounts, and thus the count of visits for direct costs (312,341) was used as the denominator when figuring the average indirect cost per visit.

**Table 6. Total Visits and Cost for Dialysis-Related MPCR Accounts, FY2004**

<b>Account</b>	<b>Account Name</b>	<b>Total Visits</b>	<b>Total Cost</b>	<b>Average Cost / Visit</b>
2410.00	Dialysis	312,341	\$ 92,837,285.80	\$ 297.23
2410.30	Dialysis – Indirect	*	\$ 34,069,466.80	\$ 109.08
Total average cost per visit:				\$ 406.31

\* MPCR does not report a visit count for indirect accounts. We therefore used the count of actual visits for direct care (account 2410.00).

#### ANALYSIS BY CLINIC CODE AND CPT CODE

Another method for accessing DSS data by clinic code is the VHA Financial and Clinical Data Mart (FCDM). DSS data in FCDM are stored on a ProClarity server in a format nicknamed “data cubes.” A web interface enables someone with access to the VA intranet to display reports based on simultaneous choices of clinic code and primary CPT code.<sup>9</sup> Separate reports can be generated for indirect costs, direct costs, and total costs. Users can see results at the national (VHA) level and can drill down to see costs by VISN.

Only outpatient DSS data were available for FY2004. DSS inpatient data cubes do not currently provide data at the level of individual production departments (e.g., CT scan, catheterization lab), dosing unit (pharmacy), or unit of service (specific procedures), and thus the analyses described

<sup>9</sup> Analyses of outpatient procedures over many years have shown that the “primary procedure” code does not always correspond to the most expensive or most clinically important procedure performed in an encounter. To find dialysis encounters, we advise searching all available procedure code fields.

below were carried out using outpatient data only. Although inpatient dialysis costs are typically captured in (outpatient) clinic code 602, the inpatient workload is usually reflected in the inpatient encounter within production unit LP. This will not pose a serious problem as long as a substantial majority of dialysis occurs in an outpatient setting.

The DSS outpatient data in FCDM are organized in part by clinic code. Choices include 50 “major clinics” reported as a single group and the individual clinics that constitute that group. The outpatient data exclude clinics 602-611, which as noted earlier are the primary codes used to report dialysis itself. The clinics represented in these data may record related services, however, such as evaluations and consultations.

Although DSS cost reports by clinic are also available through a KLFMenu application, the KLFMenu reports are not specific to particular CPT procedure codes. This is not an obstacle for clinic codes 602-611, which are used solely for dialysis. It may be a substantial problem, however, for clinics that report both dialysis-related services and other types of care.

Table 7 illustrates FY2004 indirect, direct, and total costs per encounter for four common dialysis-related procedure codes:

90935	Hemodialysis procedure with physician evaluation
90937	Hemodialysis procedure requiring repeated evaluations
90945	Other dialysis procedure with physician evaluation
90947	Other dialysis procedure requiring repeated evaluations

By construction, indirect cost and direct cost sum to the total cost in each row. The top four rows of data correspond to a predetermined group of 50 major clinics. (The choice of clinics is programmed into the application and cannot be changed by the user.) The remaining rows correspond to all other clinics in the group of 50 in which CPT codes 90935, 90937, 90945, or 90947 were used in FY2004.

Clinic 313 (Renal/Nephrology except Dialysis) appears to be the primary clinic for reporting medical evaluations and other services beyond the dialysis itself. The other six clinics were used by only a single VISN each.

Several other characteristics of DSS data are apparent from Table 7. The number and range of VISNs using a particular procedure code varies widely by code. In some cases, the national average cost reported in the data cubes is based on data from only a few VISNs. The number of observations underlying the cost estimates is not shown, and thus users should be cautious about drawing conclusions from uncommon CPT codes or clinics.

**Table 7. National Average Costs per Encounter for Selected CPT Codes, FY2004**

<b>CPT Code</b>	<b>VISNs using Code in FY2004</b>	<b>Indirect Cost</b>	<b>Direct Cost</b>	<b>Total Cost</b>
Fifty Major Clinics				
90935	1,4,6-9,12,16,20,21	\$ 106.80	\$ 148.87	\$ 255.67
90937	1,3,6,16,18	\$ 82.81	\$ 123.36	\$ 206.17
90945	1,6,8,10,18	\$ 145.33	\$ 143.18	\$ 288.50
90947	6,22,23	\$ 108.90	\$ 228.36	\$ 337.25
Clinic 313 (Renal/Nephrology except Dialysis)				
90935	4,6-9,12,20	\$ 96.92	\$ 137.31	\$ 234.23
90937	1,6,16,18	\$ 89.55	\$ 129.28	\$ 218.83
90945	1,6,8,10,18	\$ 145.33	\$ 143.18	\$ 288.50
90947	6,22	\$ 113.69	\$ 235.46	\$ 349.15
Clinic 123 (Nutrition / Dietetics – Individual)				
90937	3	\$ 49.09	\$ 93.73	\$ 142.82
Clinic 312 (Pulmonary / Chest)				
90935	21	\$ 175.42	\$ 263.71	\$ 439.13
Clinic 323 (Primary Care / Medicine)				
90935	7	\$ 96.05	\$ 121.38	\$ 217.43
Clinic 415 (Vascular Surgery)				
90935	16	\$ 81.86	\$ 158.91	\$ 240.77
Clinic 509 (MD – Individual)				
90935	1	\$ 1,610.12	\$ 1,810.09	\$ 3,420.21
Clinic 510 (Psychology – Individual)				
90947	23	\$ 75.36	\$ 178.63	\$ 253.99

## V. Workload and Costs in FY2004 OPC and HERC Average Cost Data

The previous section presented data from DSS National Data Extracts and from the Monthly Program Cost Report. An alternative source of utilization and cost data is available. The utilization data come from the National Patient Care Database (NPCD), which includes the traditional outpatient utilization file known as OPC (Outpatient Care file). Publicly accessible files are stored in SAS format and are sometimes called the Medical SAS Outpatient files.<sup>10</sup> Because NPCD do not contain cost estimates, HERC estimates a cost for every encounter through an average costing method.<sup>11</sup> The estimated cost, called the *HERC value*, represents a hypothetical Medicare reimbursement for the outpatient service.

We present workload and cost data for outpatient encounters only. Although dialysis procedures appear in the Patient Treatment File (PTF), the inpatient analogue to OPC, the HERC Average Cost data for inpatient stays apply to time spent in a bedsection or for the entire stay. HERC does not estimate costs for individual inpatient procedures.

The HERC cost data draw total costs for all direct and indirect care accounts from the Cost Distribution Report, the predecessor of MPCR. Although MPCR reports indirect costs for particular accounts, CDR did not. Instead, there is a single indirect cost account (2800) for all VA-based departments. The HERC average cost method apportioned the indirect costs to particular accounts in proportion to each account's direct costs.

**Table 8. Total Visits and Estimated Cost for Dialysis-Related Clinic Codes in NPCD Data, FY2004**

Clinic Code	Name	Total Visits	% Total Visit	Average Cost / Visit *
602	Chronic Assisted Hemodialysis	283,459	97.4 %	\$ 375.96
603	Limited Self Hemodialysis	200	0.1 %	\$ 112.94
604	Home Hemodialysis Training	542	0.2 %	\$ 273.31
606	Chronic Assisted Peritoneal Dialysis	2,089	0.7 %	\$ 249.46
607	Limited assisted Peritoneal Dialysis	498	0.2 %	\$ 179.14
608	Home Peritoneal Dialysis Training	611	0.2 %	\$ 203.66
Weighted average across codes 602-608:				\$ 373.96
610	Contract Hemodialysis	2,298	0.8 %	\$ 321.86
611	Telephone Dialysis	1,302	0.5 %	\$ 24.18

\* Cost here refers to the national HERC value, an estimated Medicare payment.

<sup>10</sup> Documentation for NPCD files may be downloaded from the VIREC web site, at [www.virec.research.med.va.gov/DataSourcesName/NPCD/NPCD.htm](http://www.virec.research.med.va.gov/DataSourcesName/NPCD/NPCD.htm).

<sup>11</sup> For details, see Phibbs et al. (2003) and Phibbs et al. (2004), both available on the HERC web site at [www.herc.research.med.va.gov/Pubs.htm](http://www.herc.research.med.va.gov/Pubs.htm).



Table 8 shows the workload and average cost (HERC value) for clinic codes 601-611. The distribution of codes was similar to that found in DSS data (see Table 3), with 97.4% accruing to clinic 602 and none in 601, 605, or 609. The total number of encounters is similar as well, 291,000 in the OPC file vs. 306,000 in the DSS outpatient NDE. The average estimated cost was considerably lower, however: \$374 for codes 602-608, versus \$469 in the DSS data (Table 4).

## V. Estimating the Cost of Dialysis Therapy

The data sources described above yield substantially different estimates of the cost a dialysis encounter. Results are summarized in Table 9 for two types of therapy: hemodialysis in clinic and peritoneal dialysis in clinic. For workload measured by hour, we assume that a dialysis encounter consists of 3.5 hours of therapy and one physician consultation (Ifudu 1998). For workload measured by encounter, we implicitly assume all encounters in these data are for dialysis and not for dialysis-related procedures. This assumption will most likely bias the figures toward zero, although the extent of bias is unknown.

Below we summarize our method in determining an average cost or lower and upper bounds for the cost of individual dialysis encounters.

**Table 9. Estimated Cost of One Dialysis Encounter, by Type and Data Source, FY2004**

Type	Aggregation Level	Source	Average Cost per Encounter*
Hemodialysis in clinic	DSS production unit	KLFMenu	\$353.60
	MPCR account	KLFMenu	\$406.31
	Clinic code (DSS)	KFLMenu	\$465.12 – \$516.01
	Clinic code (OPC/HERC)	AAC data files	\$373.96 – \$424.85
	Clinic code and CPT code (DSS)	KLFMenu + FCDM	\$465.12 – \$720.79
	Clinic code and CPT code (OPC/HERC)	AAC data files	\$373.96 – \$814.31
Peritoneal dialysis in clinic	DSS production unit	KLFMenu	\$223.27
	Clinic code (DSS)	KLFMenu	\$520.99 - \$571.88
	Clinic code (OPC/HERC)	AAC data files	\$249.46 – \$300.30
	Clinic code and CPT code (DSS)	KLFMenu + FCDM	\$520.99 – \$809.49
	Clinic code and CPT code (OPC/HERC)	AAC data files	\$249.46 – \$537.96

\* Figures for DSS production units assume a 3.5-hour encounter. All figures include one dialysis procedure and one physician consultation.

## HEMODIALYSIS IN CLINIC

### Cost by production unit

The four clinic-based hemodialysis production units ranged in average direct cost from \$38.39 to \$55.10 per hour. Weighted by hours, the average hourly direct cost across the four units was \$52.41. Office visits for nephrology had an average cost of \$50.84 per hour. Under the assumptions stated above, the average cost would be  $(3.5 * \$52.41 + \$50.84)$  or \$234.28. Adding the average FY2004 indirect rate of 50.93% raises the total to \$353.60.

### Cost by MPCR account

The average based on MPCR accounts was \$406.31, the sum of direct costs (\$297.23) and indirect costs (\$109.08). Although these MPCR accounts include all types and settings of dialysis (corresponding to clinic codes 602-604 and 606-608), in practice more than 98% of recorded procedures fall into code 602 in the DSS data.

### Cost by clinic code

Some VA sites record physician consults for dialysis within clinic code 602, whereas others report the two separately. We therefore consider a lower bound on the cost of a typical hemodialysis encounter to be the cost average cost for clinic 602 alone. For DSS data the figure was \$465.12 per encounter; for the OPC utilization files and the HERC average cost data ("OPC/HERC"), it was \$373.96. An upper bound would be the sum of the costs for clinic 602 and a nephrology consult. Production unit MD (Renal/Nephrology Clinic) had an average cost of \$50.89, as noted earlier, yielding a sum of \$516.01 (DSS). DSS production units have no exact equivalent in OPC data, and so we used the DSS figure (\$50.89) to yield an upper bound of \$424.85 for the OPC/HERC data.

### Cost by clinic code and CPT code

The lower bound is again \$465.12 for DSS data. An alternative upper bound can be calculated from CPT procedure code 90935 (Hemodialysis with One Physician Evaluation) within clinic 313 (Renal/Nephrology except Dialysis). Its average cost was \$255.67. Their sum yields an upper bound of \$720.79.<sup>12</sup>

For OPC/HERC data, the upper bound is likewise calculated as the sum of the earlier lower bound (\$373.96) plus the average cost of an encounter in clinic 313 having primary CPT code 90935. That figure was \$440.35, yielding an upper bound of \$814.31.

## PERITONEAL DIALYSIS IN CLINIC

There were relatively few instances of peritoneal dialysis in the FY2004 DSS or OPC/HERC data. Estimates of the average cost are therefore more likely to be affected by outlier values than are estimates of the cost of hemodialysis.

### Cost by production unit

The average direct cost for DSS production unit LS (Chronic Assisted Peritoneal Dialysis Clinic) was quite low, \$27.74 per hour. Three and one-half hours at this cost (\$97.09) plus a

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<sup>12</sup> This method should not double-count dialysis procedures. Clinic 313 is for nephrology services related to dialysis, whereas dialysis is reported in clinics 601-611.

nephrology visit of average cost (\$50.84) yields a total direct cost of \$147.93. Adding the average FY2004 indirect rate of 50.93% raises the total to \$223.27.

#### Cost by MPCR account

As noted above, the MPCR accounts pertaining to dialysis include all forms of therapy. Because peritoneal dialysis is quite rare, the MPCR accounts cannot be used to determine its average cost.

#### Cost by clinic code

For the DSS NDE, the average cost of clinic code 606 (Chronic Assisted Peritoneal Dialysis), \$520.99 per visit, serves as a lower bound. An upper bound that includes the average cost of a nephrology visit (\$50.84) would be \$571.88. For the OPC/HERC data, the lower bound is likewise the cost of a single encounter in clinic 606, \$249.46. Adding \$50.84 for a renal/nephrology visit yields an upper bound of \$300.30.

#### Cost by clinic code and CPT code

The same clinic code lower bounds apply here as well. If for the cost of a consult we use the average cost of a renal/nephrology encounter within CPT 90945 (Other Dialysis Procedure with Physician Evaluation), \$288.50, we obtain an upper bound of \$809.49 for the DSS data and \$537.96 for the OPC/HERC data.

### CONCLUSIONS

Given the wide range in costs shown in Table 9, what should one conclude about the average cost of hemodialysis and peritoneal dialysis? It is probably best to search for a range of values rather than a single value, for two reasons. First, a range is more likely to bracket the true value than a single value is to come very close to it. Second, the true average cost will vary across VA facilities due to variations in staffing patterns, labor costs, and the mix of dialysis modalities. A range of costs better conveys this variation.

Choosing a range is arbitrary. In both cases, the DSS production unit cost is the lowest of all estimates, and so we take it to be a lower bound on the true cost. Using the greatest value among all figures as the upper bound leads to very large ranges of costs: \$354-\$814 for hemodialysis and \$223-\$809 for peritoneal dialysis. We believe it unlikely that the actual cost is more than 150% of the DSS production unit cost. Using this assumption – admittedly arbitrary – to create an arbitrary upper bound yields ranges of \$354-\$544 for hemodialysis and \$223-\$335 for peritoneal dialysis. We note that the hemodialysis range brackets the average cost derived from MPCR accounts (\$406) and the lower bounds from all other methods. The range for peritoneal dialysis brackets the entire range from one cost method and the lower bound from another. Although not confirmation, these provide some comfort that the estimated ranges are reasonable.

## **VI. Inpatient dialysis workload and costs**<sup>13</sup>

When the DSS system was established, it did not have a reliable way to capture inpatient dialysis workload and costs. In order to estimate those figures, many VA sites created an Account Level Budgeter cost center (ALBCC) for inpatient dialysis but sent the costs to a generic workload unit called 5WW1. This unit functions as a per-diem cost for all costs that have ALBCCs but do not capture workload. All such ALBCCs are mapped to 5WW1, and then a daily average cost is calculated and assigned to each inpatient.

Over time, more and more VA sites are using the Event Capture system to record inpatient procedures not already recorded in DSS. When a site begins to use Event Capture for inpatient dialysis, it stops mapping the dialysis ALBCC to 5WW1. The workload and costs are then mapped to the workload-specific department in DSS. At many sites, there is a single ALBCC and Department Cost Manager (DCM) for a particular procedure. Inpatient and outpatient care are recorded there without differentiation.

Some VA sites pool inpatient and outpatient dialysis costs and then allocate them between the two using the relative workload burden. For example, if a nurse spends 30% of her time doing inpatient dialysis and 70% doing outpatient dialysis, inpatient dialysis will be assigned 30% of her costs and outpatient dialysis will be assigned 70% of her costs.

One can calculate inpatient dialysis costs at sites that record dialysis through Event Capture system. Extracts of Event Capture data are generally transmitted to DSS, and thus price per workload unit could be computed. The costs included by each site, however, may vary. Some but not all sites use Event Capture to record dialysis for ICU patients. ICU staff time is considerably more costly due to specialized training and higher staff-patient ratios. Sites that record ICU dialysis through Event Capture will have higher average costs per episode than other sites. Another difference across sites concerns physician consultations. Some sites include the cost of a consult in the total cost of dialysis, where as other sites do not. As noted earlier, a typical nephrology physician visit will add \$50 or more to the total cost of a dialysis encounter.

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<sup>13</sup> This section draws heavily on personal communications from Jim Jackson, RN, BS, Decision Support Manager and Clinical Facilitator at the Portland VA Health Care System.

## VII. VA-paid dialysis at non-VA facilities

VA will pay for medical services at non-VA facilities under limited circumstances. Such care is recorded primarily in two databases: the Fee Basis (or FEE) files and the Non-VA Hospitalization files. VA facilities may also contract with outside providers to provide dialysis within VA facilities. Workload from contract care will be captured in VISTA and transmitted to VA utilization databases. The DSS system will estimate costs in the usual manner, although they are likely to be subject to greater error than are estimates for care provided by VA staff.

MPCR account 4120 (Contract/FEE Dialysis) captures use and cost of both contract and Fee Basis dialysis care. Data are available through the KLFMenu, as described in Appendix 2. Note that for account 4120 there are no suffixes (such as .00 or .30). Either VA does not distinguish between direct and indirect costs when it pays non-VA providers, or that distinction is not recorded in MPCR.

Most VA facilities paid for contract or Fee Basis dialysis services in FY2004 (data not shown). Nationwide, 187,412 workload units were recorded at a total cost of \$59,021,063.20, yielding an average cost of \$314.93. The national average is reported as variable UNITDEPT in the MPCR data, while facility-level averages are labeled UNITFAC. A number of sites report costs without workload, however, meaning that the true cost per workload unit was somewhat lower.

Can one compare the cost of contract or Fee Basis dialysis compare with the costs of the same care provided by VA staff? Contract care provided within a VA facility most likely excludes a physician visit. Fee Basis dialysis would be provided mostly to low-acuity patients, and thus a physician visit most likely would not accompany the dialysis. Thus, the best comparisons to VA are to the DSS production units corresponding to Hemodialysis in Clinic (units 2G, 2I, 2K, and LP) and to clinic code 602 (Chronic Assisted Hemodialysis). As noted in Table 10, the average cost for contract and Fee Basis care falls between them.

**Table 10. Average cost of dialysis encounters by provider type, FY2004**

Type	Aggregation Level	Provider	Average Cost per Encounter*
Hemodialysis in clinic	DSS production units 2G, 2I, 2K, and LP	VA Staff	\$276.89
Dialysis (unspecified)	MPCR account 4210	Contract / FEE	\$314.93
Chronic assisted hemodialysis	Clinic code 602	VA Staff	\$465.12

\* Unlike Table 8, here costs for physician visits were not added. Production unit values assume a treatment duration of 3.5 hours.

The figures in Table 10 should be compared with caution. First, nearly all contract and Fee Basis care will be outpatient, whereas a significant proportion of VA-provided dialysis will be for inpatients. The higher acuity and greater overhead costs of inpatients are likely to raise the average cost of VA-provided care. Second, contract care is likely to include profit for the non-VA provider, thereby raising the cost slightly relative to VA-provided care. The net bias in costs from these countervailing effects is unknown.

## **VIII. Recommendations**

### RECOMMENDATIONS FOR IDENTIFYING DIALYSIS

Following are recommendations for researchers interested in locating dialysis treatment in VA utilization databases.

#### **1. Search all available files**

Search all relevant databases. For inpatient care, search for dialysis-related diagnosis and procedure codes in the Main, Bedsection, Procedure, and Surgery files. For non-VA care, search both Fee Basis and Non-VA Hospitalization files.

#### **2. Search from every angle**

Search for all relevant codes shown in Appendix 1. If one has particular patients in mind, it may be helpful to determine the complete list of dialysis-related procedures used in a particular database in each year under consideration, and then to search for those procedures for the patients of interest.

#### **3. Use diagnoses to find procedures**

Inpatient diagnoses are less likely to be underreported than inpatient procedures. Any patient with a diagnosis of acute renal failure (ARF) or chronic renal failure (CRF / ESRD) will receive dialysis, unless he or she dies or spontaneously recovers within a day of diagnosis. Recovery of renal function can occur quickly, so one cannot assume that someone hospitalized for 14 days beyond an ARF diagnosis received dialysis for the entire 14-day period. Nevertheless, an ARF or CRF/ESRD diagnosis is nearly always followed by at least one dialysis treatment. Similarly, patients with two or more CRF/ESRD diagnoses over time may be assumed to have received dialysis between the diagnoses, although not necessarily at VA expense.

#### **4. Search both inpatient and outpatient files to find inpatient care**

Search both inpatient and outpatient records to find inpatient care. The DSS system is not structured to record inpatient and outpatient dialysis separately. Some local VA systems record all dialysis as outpatient care, even when it occurs in an inpatient setting.

#### **5. Survey patients to learn of non-VA dialysis**

Interviews with DSS program managers and other officials indicate that VA-paid care at outside facilities is poorly captured in VA utilization files. Researchers should not depend on them for determining the extent of such care. Patients must be surveyed directly about non-VA dialysis, whether paid by VA or not.

### CONSIDERATIONS FOR SENSITIVITY ANALYSES

#### **6. Use alternative data sources.**

As noted above, there are considerable differences in the implied cost of a dialysis encounter by data source. A sensitivity analysis should include alternative values of dialysis costs.



### **7. Consider regional variations in cost structure and DSS formulas.**

There is also great variation in dialysis costs across VISNs, even within a single data source. This may reflect varying labor and supply costs, differential use of non-VA contract dialysis, differences in average acuity and other patient characteristics, and differences in the formulas for direct and indirect costs that underlie the DSS system. Comparisons of dialysis costs across VISNs should control for as many of these factors as possible. DSS program managers at each VISN can provide details on how dialysis procedures are accounted for at their facilities.

### **8. Consider patient acuity**

Comparisons between freestanding dialysis clinics and hospital-based dialysis must take account of patient acuity. Sicker patients (those with higher acuity) are more likely to use hospital-based dialysis facilities. Because they need greater staff attention, the hospital-based clinics will tend to be more expensive than freestanding clinics.

### **9. Consider inpatient treating section**

Among inpatients one should consider the distinction between regular and intensive care units (ICUs). ICU costs are typically much higher than those of other hospital clinics due to greater staff training and to significantly greater overhead costs. As a result, an episode of dialysis will be more costly in an ICU than in other hospital bedsections or in freestanding dialysis clinics. In some cases, VA patients with lower acuity – typically those with ESRD – may be directed to freestanding non-VA dialysis clinics in order to obtain Medicare-funded services.

### **10. Avoid comparisons to Medicare**

Medicare funds ESRD separately from other services, and program rules make comparisons to VA difficult or unreliable. For information on the special ESRD funding program, see the ESRD web site of the federal Centers for Medicare and Medicaid Services ([www.cms.hhs.gov/providers/esrd.asp](http://www.cms.hhs.gov/providers/esrd.asp)).

## **RECOMMENDATION FOR VA POLICYMAKERS**

### **11. Policy Clarification**

The consistency of DSS data would be enhanced if VA policymakers made definitive statements on several issues:

- \* What specific elements of care should go into the dialysis production units? For example, should dialysis-related provider visits be counted separately under the nephrology clinic (similar to Medicare reimbursement rules for ESRD), or should they be rolled into clinic code 602?
- \* Who has responsibility for developing systemwide rules for workload capture and costing?

## **MICRO-COSTING DIALYSIS**

The purpose of this report is to detail how VA utilization and cost databases may be used to study VA-paid dialysis care. An alternative approach is micro-costing. The researcher determines each element of care – supplies and machinery, staff time, and prescription medications – and assigns a price to each. The sum of the costs of individual elements plus an appropriate allowance for indirect costs equals the total cost. This approach is described more

fully in Smith and Barnett (2003) and in the HERC guidebook on micro-costing (Smith et al. 2004).

Cost estimates for VA care are readily available. The cost of VA supplies and machinery may be determined from purchasing agents at VA facilities. Although most medical supplies are single-use items, some supplies and machinery are used for multiple episodes of dialysis. These must be assigned a cost per use based on their expected lifetimes. The cost of VA staff time can be found through surveys or from national VA datasets (e.g., see tables in Smith and Velez 2004).

Indirect costs may be a considerable fraction of the total cost for inpatient dialysis, particularly for ICU-based treatments, and thus cannot be ignored. Although they cannot be estimated through micro-costing, the DSS system calculates estimates. As with direct costs, the user must take into account that the formulas for calculating indirect cost vary from facility to facility. A national or regional (VISN) average will be more externally valid than an estimate from a single facility.

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## **Appendix 1**

### **Additional Tables**

TABLE A1. DIALYSIS CODES BY CODING SYSTEM

ICD-9-CM Diagnoses

584	Acute renal failure
585	Chronic renal failure
586	Renal failure NOS
V45.1	Renal dialysis status (patient is admitted for other reason, but had dialysis while in hospital)
V56	Encounter for dialysis and dialysis catheter care (dialysis is only reason patient is in the hospital)

ICD-9-CM Procedures

39.95	Hemodialysis
54.93	Creation of cutaneoperitoneal fistula (i.e. for CAPD)
54.98	Peritoneal dialysis

CPT codes

90918	ESRD services per full month (age < 2)
90919	ESRD services per full month (ages 2 to 11)
90920	ESRD services per full month (ages 12 to 19)
90921	ESRD services per full month (ages 20+)
90922	ESRD services less than full month, per day (age < 2)
90923	ESRD services less than full month, per day (ages 2 to 11)
90924	ESRD services less than full month, per day (ages 12 to 19)
90925	ESRD services less than full month, per day (ages 20+)
90935	Hemodialysis procedure with single physician evaluation
90937	Hemodialysis procedure requiring repeated evaluations
90939	Hemodialysis access flow study
90940	Hemodialysis access flow study, measurement and disconnection
90945	Other dialysis procedure with single physician evaluation
90947	Other dialysis procedure requiring repeated evaluations
90089	Dialysis training, course completed
90993	Dialysis training, course not completed
90997	Hemoperfusion
90999	Unlisted dialysis procedure
99512	Home VISIT hemodialysis
99559	Home VISIT peritoneal dialysis

**Table A1 (cont'd)**HCPCS PSAS Codes

<u>Code</u>	<u>Description</u>
A4690	Dialyzer
A4706	Bicarbonate concentrate, gallon
A4707	Bicarbonate concentrate, packet
A4708	Acetate concentrate solution, gallon
A4709	Acid concentrate solution, gallon
A4712	Water, sterile, 10 ml
A4714	Treated water, gallon
A4719	Y set tubing for peritoneal dialysis
A4720	Dialysate solution (250-999 cc)
A4721	Dialysate solution (1000-1999 cc)
A4722	Dialysate solution (2000-2999 cc)
A4723	Dialysate solution (3000-3999 cc)
A4724	Dialysate solution (4000-4999 cc)
A4725	Dialysate solution (5000-5999 cc)
A4726	Dialysate solution (6000+ cc)
A4730	Fistula cannulation set, each
A4736	Topical anesthetic, for dialysis, gm
A4740	Shunt accessory
A4750	Blood tubing, arterial or venous
A4755	Blood tubing, arterial and venous
A4760	Dialysis solution test kit
A4765	Dialysate concentrate, powder, packet
A4766	Dialysate concentrate, solution, 10ml
A4770	Blood collection tube, vacuum, 50
A4771	Serum clotting time tube, 50
A4772	Blood glucose test strips, 50
A4773	Occult blood test strips, 50
A4774	Ammonia test strips, 50
A4801	Heparin, 1000 units
A4802	Protamine sulfate, 50mg
A4860	Disposable catheter tips
A4870	Plumbing and/or electrical work at home
A4890	Contracts, repair and maintenance
A4911	Draig bag/bottle
A4913	Miscellaneous dialysis supplies NOS
A4918	Venous pressure clamp, for dialysis
A4927	Gloves, non-sterile, for dialysis
A4928	Surgical mask, for dialysis
A4929	Tourniquet, for dialysis
C1037	Vaxcelchronic dialysis catheter

C1750	Catheter, hemodialysis, long-term
C1752	Catheter, hemodialysis, short-term
C1881	Dialysis access system (implantable)
E1500	Centrifuge for dialysis
E1510	Kidney, dialysate delivery system machine
E1520	Heparin infusion pump
E1530	Air bubble detector, replacement
E1540	Pressure alarm, replacement
E1550	Bath conductivity meter
E1560	Blood leak detector, replacement
E1570	Adjustable chair, for ESRD patients
E1575	Transducer protectors/fluid barriers
E1580	Unipuncture control system
E1590	Hemodialysis machine
E1592	Automatic intermit peritoneal dialysis sys
E1594	Cycler dialysis machine
E1600	Delivery and/or installation charges
E1610	Reverse osmosis water purification system
E1615	Deionizer water purification system
E1620	Blood pump
E1625	Water softening system
E1630	Reciprocating peritoneal dialysis system
E1632	Wearable artificial kidney
E1635	Compact (portable) travel hemodialyzer
E1636	Sorbent cartridges, 10
E1637	Hemostats, each
E1638	Heating pad
E1639	Scale
E1640	Replacement components for dialysis
E1699	Dialysis equipment NOS
SI215	Dialysis shunt abdominal
SI202	Abd catheter intraperitoneal

TABLE A2. STATIONS PARTICIPATING IN CSP #530 IN FY2004

Station Number	Station Name
506	Ann Arbor
528	Upstate New York
546	Miami
549	Dallas
580	Houston
583	Indianapolis
598	Little Rock
626	Nashville
629	New Orleans
646	Pittsburgh
648	Portland
652	Richmond
662	San Francisco
663	Puget Sound
664	San Diego
672	San Juan
689	West Haven
691	Greater Los Angeles



TABLE A3. DIALYSIS-RELATED PRODUCTION UNITS FOR CSP #530 SITES, FY2004

Production Unit	Production Unit Name	National DSS	506	528	546	549	580	583	598	626	629	646	648	652	662	663	664	672	689	691
	<b>Hemodialysis in Clinic</b>																			
2G	Inpatient Dialysis	x	x	x				x							x				x	
2K	Dialysis OP	x						x		x										x
LP	Dialysis Outpatient CL	x	x	x	x	x	x				x					x		x	x	
2I	Hemodialysis Unit	x							x			x	x	x	x		x	x		
LO	Acute Hemodialysis Treatment Clinic																			
	<b>Peritoneal Dialysis in Clinic</b>																			
LS	Chronic Assisted Peritoneal Dialysis CL	x	x												x					
LT	Limited Self Care Peritoneal Dialysis C																			
2J	Peritoneal Dialysis Unit																			
	<b>Home Dialysis</b>																			
2E	Home Dialysis Unit	x												x						
LR	Home Dialysis Clinic	x	x												x					
LU	Home Peritoneal Dialysis Training CL	x																		
	<b>Related Production Units</b>																			
2F	Nephrology	x																		
MD	Renal/Nephrology Clinic(s)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2G, 2K, LP, 2I	All Hemodialysis in Clinic	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2J, LS	All Peritoneal Dialysis in Clinic	x	x												x					
2E, LR, LU	All Home Dialysis	x	x											x	x					
MD	Related Production Units	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

TABLE A4. DESCRIPTIVE STATISTICS FOR DIALYSIS-RELATED PRODUCTION UNITS AT CSP #530 SITES, FY2004

Production Unit	Production Unit Name	N	Hours	Direct Cost	Mean	SD	Min	Max
	<b>Hemodialysis in Clinic</b>							
2G	Inpatient Dialysis	5	23,953	\$1,065,380.65	\$44.48	\$7.03	\$39.27	\$91.41
2K	Dialysis OP	3	132,602	\$5,875,863.15	\$44.31	\$0.79	\$43.35	\$45.11
LP	Dialysis Outpatient CL	9	260,471	\$15,854,925.11	\$60.87	\$15.19	\$42.34	\$81.06
2I	Hemodialysis Unit	7	234,034	\$13,178,888.50	\$56.31	\$7.33	\$37.86	\$68.96
LO	Acute Hemodialysis Treatment CL	0	0	\$0.00				
	<b>Peritoneal Dialysis in Clinic</b>							
LS	Chronic Assisted Peritoneal DC	2	2,244	\$62,251.91	\$27.74	\$8.81	\$26.83	\$112.48
LT	Limited Self Care Peritoneal DC	0	0	\$0.00				
2J	Peritoneal Dialysis Unit	0	0	\$0.00				
	<b>Home Dialysis</b>							
2E	Home Dialysis Unit *	1	3,270	\$371,118.46	\$113.49		\$113.49	\$113.49
LR	Home Dialysis Clinic	2	4,588	\$427,063.80	\$93.08	\$1.41	\$92.98	\$112.48
LU	Home Peritoneal Dial. Training CL	0	0	\$0.00				
	<b>Related Production Units</b>							
2F	Nephrology	0	0	\$0.00				
MD	Renal/Nephrology Clinic(s)	18	142,504	\$6,470,348.09	\$45.40	\$16.11	\$21.11	\$91.46
2G, 2I, 2K, LP	All Hemodialysis in Clinic	18	651,060	\$35,975,057.41	\$55.26	\$12.30	\$41.78	\$81.06
2J, LS	All Peritoneal Dialysis in Clinic	2	2,244	\$62,251.91	\$27.74	\$8.81	\$26.83	\$112.48
2E, LR, LU	All Home Dialysis	3	7,858	\$798,182.26	\$101.58	\$10.12	\$92.98	\$113.49
MD	Related Production Units	18	142,504	\$6,470,348.09	\$45.40	\$16.11	\$21.11	\$91.46

Glossary: OP = outpatient, CL = clinic, DC = dialysis clinic

\* At one site, production unit 2E had 0 hours and \$374.31 cost; we dropped these costs from our analyses.

## **Appendix 2**

### **Sources and Access**

## SOURCE DATA

All data for this study were extracted from KLFMenu, the website of the VA VISN Support Services Center (VSSC). The URL is <http://klfmenu.med.va.gov>. Below are the exact series of steps used in December 2004 and January 2005 to obtain the FY04 data shown earlier.

### DSS Production Units

1. Log into KLFMenu.
2. Click on “DSS” on the far left, then on “DSS Reports.”
3. Click on “National Data Extracts (NDE) Reports.”
4. Click on “DSS Departments Budget and Cost Reports (ALBCC).”
5. Click on “Production Unit Summary – DSS Appropriated / Nonappropriated.”
6. In the new window, choose Fiscal Year = 2004, Ending Fiscal Period = September, and Summary Level = National.
7. Scroll down and check “View Now.”

### Clinic Code (Stop Code)

Follow steps 1-3 as above.

4. Click on “Outpatient Analyses and Cost Reports.”
5. Click on “Costs for Selected DSS Clinic Stops.”
6. In the new window, choose Fiscal Year = 2004 and Summary Level = national. Under “Select Clinic Stops / DSS ID,” scroll down and highlight 601 through 611.
7. Check “View Now.”

### MPCR Account

1. Log into KLFMenu.
2. Click on “Financial” on the far left.
3. Click on “Monthly Program Cost Reports (MPCR)” and then on “MPCR Report.”
4. In the new window, choose Fiscal Year = 2004, Month = September, and Summary Level = National. Scrolling down, make the following choices. Words in capitals and numbers must be chosen or typed in:  
If Account is ... EQUAL ... 2410.00 ... OR ... Account is ... EQUAL ... 2410.30.  
Choose “YES” for the question about whether to see data broken down by account.
5. Scroll down and check “View Now.”

### Data cubes on ProClarity server

1. Log into KLFMenu.
2. Click on “Financial Clinical Data Mart (FCDM)” on far left. When prompted for a username, type “vhaXX / *username*” without spaces or quotation marks. XX is your two-digit VISN number and *username* is the one used to log into KLFMenu.
3. Click on “Decision Support System (DSS).”
4. Click on “DSS Outpatient.”
5. Click on “Reports.”
6. Click on your choice: direct, indirect, or total costs per encounter/patient.
7. On the left, where it says “Drill Down to...”, scroll down to “PrimaryCPT – All CPT.”
8. In the center-top frame, in the box reading “Fifty Clinic Group,” either keep that choice by doing nothing OR scroll down to and choose a particular clinic stop (e.g., 301, 313, 323).
9. In the bottom center frame, click on the down arrow next to “Medicine” to reveal more detail. To reveal data for each VISN, click on the down arrow next to “VHA.”

10. In the same frame, click on the down arrow next to “Dialysis” to reveal more detail. CPT codes relating to dialysis (range 90918-90999) will be displayed.

Note that fewer CPT codes may appear at finer levels of clinic detail. If a code does not appear, one may assume that it was not used in that combination of clinic, year, and cost type (direct, indirect, total). To reveal data for each VISN, click on the down arrow next to “VHA.”

Printing is done by frame. To avoid printing unneeded frames, click on any cell within the desired frame prior to printing.

## ACCESS

Use of KLFMenu and data cubes on the ProClarity server are limited to individuals with access to the VA intranet.

Some data on KLFMenu are confidential. For example, cost data for individual VA stations should not be released to the public with station name unless the user has obtained assurance from VSSC that the release is acceptable. VISN-level data may be confidential in some cases, particularly when services are offered at only one site within a VISN (e.g., methadone treatment, specialized rehabilitation facilities).